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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,708	01/12/2004	Mark R. Fernald	WEAT/0553	9757

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PATTERSON & SHERIDAN, L.L.P.
3040 POST OAK BOULEVARD, SUITE 1500
HOUSTON, TX 77056

EXAMINER	
HUGHES, JAMES P	
ART UNIT	**PAPER NUMBER**
2883	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/755,708	FERNALD ET AL.	
	Examiner	Art Unit	
	James P. Hughes	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-12 are objected to because they fail to clearly identify the invention for which the applicant seeks patent rights. Claim 1 is objected to because the recitation of the phrase "**large** diameter optical waveguide" (emphasis added) in the preamble is unclear at to what constitutes "large". Claims 2-12 are objected to because they inherit the deficiencies of claim 1. Appropriate action is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 6, 7, 9, 13, 15-18, 21, 23, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Ruegenberg (2005/0180703).

Ruegenberg (2005/0180703) teaches a method and apparatus wherein a first (10) and second fibers (11) are arranged on positioning elements (12, 13, 14) which enable a spatial alignment of the fibers in three axes and can move the two fibers toward, and away from, each other during a fusion splicing process. A laser source (15) provides a laser beam (16) which is split into a plurality of beams via a beam splitter (e.g. 17) which

impinge on the two fibers (10 and 11) – which may have different outer diameters. The power provided by the laser beams to the heat zone (e.g. 28) of the coupled fibers (10, 11) is measured and controlled via a measurement and control system (e.g. 19, 20, 21, 22, 23). (Paragraphs 15-26 and Fig. 1)

The term "large" in the phrase "large diameter waveguide" recited in the preamble has not been given significant patentable weight. The term is unclear as discussed above. Additionally, the term does not breath life and meaning into the claim. See e.g. MPEP 2111.02.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 10, 13, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruegenberg (2005/0180703) in view of Chapman et al. (2003/0223712). Ruegenberg (2005/0180703) teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Chapman et al. (2003/0223712) teaches a method and apparatus for: placing two optical fibers in at least two stages wherein the stages allow movement of the fibers relative to each other: aligning distal ends of two optical fibers (12 and 14), then cleaving the end of an optical fiber (12) with a first laser (16), next cleaving the end of a second fiber (14) with a second laser (18), and following, fusing the two fibers together with a third laser (22). (See e.g., paragraphs 16-20 and Fig. 3) Chapman further teaches that the third laser beam (26) may be split into multiple component beams via a splitter device (79) to impinge on the two fibers, thereby forming a fusion splice. (See paragraph 21) Chapman reads at least on claims 1, 13, and 21.

Regarding claim 24. Ruegenberg does not explicitly teach employing two sources for generating lasers employed in fusion splicing.

As Chapman teaches employing two laser sources for preparing an optical fiber for fusion splicing is advantageous because it allows a high reliability and control of the heat source (see e.g. p. 25) and Ruegenberg recognizes that uniform thermal management of the fusion splice region is advantageous (see e.g. p. 20-26); it would have been obvious to one of ordinary skill in the art at the time of the invention to employ two laser

sources as taught by Chapman in the invention of Ruegenberg. One of ordinary skill in the art at the time of the invention would have been motivated to do so because the power output provided to the two fibers – of potentially different sizes – could be controlled more precisely, thus yielding an efficient splicing method and apparatus.

Regarding claim 10. Ruegenberg does not explicitly teach application of a laser to the fibers prior to splicing. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ lasers to strip and cleave optical fibers prior to fusion splicing wherein the splicing laser(s) power is higher than the preparation laser(s) power as taught by Chapman in the invention of Ruegenberg. One would have been motivated to do so because such a combination would yield an efficient apparatus and method of fiber preparation and splicing by, at least, reducing physical contact of operators with said fibers.

4. Claims 1, 4, 5, 13, 20, 21, 27, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruegenberg (2005/0180703) in view of Eskildsen et al. (2003/0108307). Ruegenberg (2005/0180703) teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Eskildsen et al. (2003/0108307) teaches an apparatus and method for aligning two fibers for fusion splicing and subsequently evaluating the loss of the resulting splice. Eskildesen teaches that a power monitoring may be accomplished automatically by transmitting optical power through the fibers and detecting the power after traversing the fusion splice. Following, the detected power may be used as a feedback signal to adjust

the lateral position of the fibers. (See e.g. p. 13) Eskildsen also teaches that the loss of the resulting spliced fiber may be measured via similar methods. (See e.g. p. 16) While Ruegenberg in view of Eskildsen does not explicitly teach splicing fibers with reflective gratings, such fibers are commonly used in the art and could be incorporated in these inventions.

Ruegenberg does not explicitly teach detecting light passing through a spliced region or the specific signal processing employed. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ alignment and analysis systems and methods as taught by Eskildsen in the invention of Ruegenberg. One would have been motivated to make such a combination because it would yield an efficient means for fusion splicing optical fibers.

5. Claims 1, 8, 11, 13, 19, 21, 26, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruegenberg (2005/0180703) in view of Huang et al. (2005/0117856). Ruegenberg (2005/0180703) teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Huang et al. (2005/0117856) teaches an apparatus and method of splicing optical fibers wherein mechanical and electrical shutters may control the exposure of laser light to a fusion splice region. Huang additionally teaches that a laser may be applied to the fibers so that the fiber ends become soft and are slightly deformed – thus forming a curvature. Huang teaches that this is beneficial for the fusion process. (See e.g. p. 28-37) Huang additionally teaches that visible laser beams may be employed in alignment of fibers in fusion splicing. (See e.g. p. 8)

Ruegenberg does not explicitly teach employing a shutter device to control the laser. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a shutter device because shutter device are commonly used in the laser art to control laser beams as, for example, taught by Huang in the invention of Ruegenberg because this would allow controlled application of the laser beam. One would have been motivated to do so because it would yield an efficient method and device, for example it would provide protection from inadvertent exposure of the laser.

Ruegenberg does not explicitly teach applying a laser to the fibers to provide a curvature to their distal ends. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the splicing techniques such as applying a laser to the fibers thus providing a curvature to their distal ends. One would have been motivated to do so because it would yield an efficient fusion splice.

Ruegenberg does not explicitly teach employing a visible laser beam during alignment of the fiber splice. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate an alignment system as taught by Huang, including splitting the visible beam, in the invention of Ruegenberg. One would have been motivated to do so because it would yield an efficient manner for aligning the fibers.

Ruegenberg does not explicitly teach employing a lathe in the fusion process. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a lathe for rotating the fibers in the invention of Ruegenberg. One would

have been motivated to do so because it would yield an efficient manner for aligning the fibers; for example, it would allow uniform heating of the splice region.

6. Claims 1, 12-14, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruegenberg (2005/0180703) in view of Walters et al. (2001/0014198). Ruegenberg (2005/0180703) teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Walters teaches fusion splicing of fibers large optical devices which have a much larger cross section than standard optical fibers. Walters teaches a method and apparatus employing a split laser beam similar to Ruegenberg for such fusion splicing.

It would have been obvious to one of ordinary skill in the art at the time of invention to employ the laser fusion apparatus and method of Ruegenberg to connect optical components – such as those with a 400 um and grater diameter – to each other as is taught by Walters. One would have been motivated to do so because it would yield an efficient manner for connecting such optical devices.

Conclusion

7. Bryant et al. (2004/0165834) teaches an apparatus and method of splicing two optical fibers together employing two laser beams (e.g. the beams on either side of fiber 105 in Fig. 1) Ljungqvist et al. (5,649,040) teaches a laser fusion splicing device employing two separate laser sources. Thompson (6,463,872) teaches a laser photocuring source for curing a coating on an optical fiber employing two different lasers or splitters yielding multiple laser beams. (See Col. 4, ll. 55 – Col. 5, ll. 50, and Figs. 2-5).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 571-272-2474. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James P. Hughes
Patent Examiner
Art Unit 2883

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800